

V. An Account of BOOKS.

1. *An Essay toward a Natural History of the Earth, and Terrestrial Bodies, especially Minerals: As also of the Sea, Rivers, and Springs. With an Account of the Universal Deluge, and of the Effects that it had upon the Earth.* By John Woodward, M. D. Professor of Physick in Gresham College, and Fellow of the Royal Society. Printed for Ric. Wilkin at the King's Head in St. Paul's Church-yard. 1695. Octavo.

THE Author of this Book having with great Industry, and no less Success, made Enquiry into many considerable Parts of Nature, hath thought fit here to set forth an Account of several of his Observations, and of certain Conclusions which he hath drawn from them, whereof many are indeed of great weight and moment, but all in a compendious manner, as intending this Discourse only as a *Prælude* to one much larger, and to comply with the Importunities of some Persons of Worth, who requested a brief Account of these things from him, for their present Satisfaction, until his Affairs should permit the compleating of his Greater Work, which he promiseth, with a further Proof both of these, and of others not yet propos'd. Which how able he is to perform, he hath shewn in this present Essay.

He begins with an Account of his Observations upon the grosser and more massy parts of the Terrestrial Globe, all which lye *Stratum super Stratum* in the Earth; such as Marble, Stone, Coal, Chalk, Sand, Gravel, Clay, Marle, and other sorts of Earth. Amongst other things, he observes that there are lodged vast Numbers of Sea-shells, and other Marine Bodies, in these Terrestrial *Strata*, as well as in the more solid ones, (as Stone and Marble, wherewith they are incorporated, being lodged amongst

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the matter whereof they consist, and found in the midst of the Stone of Rocks and Quarries) as in those that are not so hard; such as Chalk, Clay, and the like: And this in the most midland Countries as well as in those which are nearer to the Sea. He observes, that these Shells are thus found inclosed in this Terrestrial Matter from the Surface of the Earth down to the very bottom of the deepest Quarries and Mines: That they lye according to the order of their Specifick Gravity, the heavier kinds deeper, the lighter nearer unto the surface of the Earth, and both the one and the other amongst Terrestrial matter, that is of the same Specifick Gravity that they are of: And this not only in *England*, but in other parts of *Europe*, yea, in *Asia*, *Africa*, and *America*; or in short, all the World over. But because many Learned Men of late have doubted whether these were truly Shells or not, he removes that Doubt, and answers their Objections, proving these to be the real Shells of once living Shell-Fish, and that they were Originally generated in the Sea.

This dispatch'd, he proceeds to the Body of the Work, which he hath divided into six Parts. In the first of which he examines the ways whereby other Authors have thought these Shells were brought to Land; and particularly those who suppose that there happen great Changes of Sea and Land: *e. gr.* That there have been many and great Islands raised from the bottom of the Sea by Earthquakes; such as *Rhodes* and others: That the Center of Gravity in the Terraqueous Globe shifts and moves, and consequently the Water of the Sea moves also; so that it deserts those Tracts of Land which it formerly covered, and betakes it self to others, which were till then dry Land. That the mud which is carried down into the Sea by Rivers, and præcipitated at their *Ostia*, makes daily additions to the Earth, which therefore encroaches and gains upon the Sea, as the Sea
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in other places does upon the Earth: That the Sea by these means being forced off, and having left many parts of the Globe that it heretofore possessed, it also left there behind it shells and other Sea-Productions.

But to these Opinions our Author replies, that they are destitute of all true Foundation, and repugnant to Observation; that on them can never possibly be accounted for the Circumstances of these Marine Bodies, as their being lodged in the middle of Rocks, their Numbers, Order, Variety, depth in the Earth, distance from any Sea, and the like. So that though such Changes as they suppose had really happened, yet these Shells, &c. could never by them have been put into the condition wherein they are now found; but he further adds, that there is not any Reason to believe that such Changes did ever happen, they having not the least Countenance either from the present face of the Earth, or any Credible and Authentick Records of the Ancient state of it, but that the Globe is to this day nearly in the same condition that the Universal Deluge left it. Lastly, he enquires what it was that misled so many Learned Men, especially amongst the Ancients, into a belief of such Alterations of Sea and Land, shewing that it was chiefly their meeting with these Shells in their Fields and Quarries.

In the Second Part he treats of the Universal Deluge, to prove that these Marine Bodies were then left at Land, and that at the Deluge there were made several very great and strange Alterations in the Terrestrial Globe, particularly that the whole Globe was then dissolved, the Particles of Stone, Marble, and all other Solid Fossils dissevered, taken up into the Water, and there sustained, together with Sea-shells, and other Animal and Vegetable Bodies: That at length all these subsided from the Water, according to the order of their Gravity; the heaviest Bodies first, then those which were lighter, but all that

had the same degree of Gravity, settled down at the same time ; so that those Shells or other Bodies that were of the same Specifick Gravity with Sand, sunk down together with it, and so were inclosed in the *Strata* of Stone which that Sand formed: Those Shells which were lighter, and but of the same Gravity with Chalk (in such parts of the mass where any Chalk was) subsided at the same time that the Chalky Particles did, and by that means became lodged in the *Strata* of Chalk, and in like manner all the rest. He shews how the present Earth was formed out of this promiscuous mass of Sand, Earth, Shells and the rest, falling down again and subsiding from the Water: And that this Sediment was plain and equal, the *Strata* continuous, and consequently the Globe at first even and Sphærical, the Water lying above all, covering and environing the whole Globe: That after a while the said *Strata* were broken and dislocated, some elevated, and others depressed, by which means all the inequalities of the Globe, Fissures, Grottoes, Mountains, Valleys, Islands, the Chanel of the Sea, and all others were formed ; the whole Terraqueous Globe being at the time of the Deluge put into the condition that we at this day behold. In the next place he shews that this great Revolution was brought about by the Hand of Almighty God, and that meerly out of Goodness and Compassion to Mankind: That the Primitive Earth was contrived and suited to the first and innocent state of Mankind its Inhabitants, and for whose use 'twas made ; but when Humane Nature had by the Fall of *Adam* suffered so great a Change, 'twas highly necessary the Earth should undergo a Change too ; that it should be fashioned anew, and better accommodated to the present frail condition of Mankind ; and such a Change (as he makes out more at large) was brought to pass at the Deluge. He concludes this Part with an Account of the Trees which are found in great plenty buried in Mosses, Fens, or Bogs,

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both in *England* and other Countries, shewing that they were depofed there by the Deluge, and by what means they have been preferved down to our Times.

The Third Part, which is concerning the Fluids of the Globe, he fubdivides into two Sections; the former whereof comprehends the Prefent and Natural ftate of the Water within and upon the Earth, fhewing that there is a vaft mafs of Water inclofed in the Bowels of the Earth, which is what *Mofes* calls the Great Abyfs: That this Abyfs communicates with the Ocean by means of certain *Hiatus's* paffing betwixt them, and is the ftanding Fund which fupplies Water to the furface of the Earth, as well Springs and Rivers, as Vapours and Rain: That there is a nearly Uniform and conftant Fire or Heat diffeminated throughout the Body of Earth which evaporates the Water of the Abyfs, elevating it thence up to the furface of the Earth, where part of it iffues forth in Vapour, afcends into the Atmosphære, and is returned back again in Rain, &c. the reft (by a particular Pofture and Mechanifm of the *Strata* near the furface of the Earth, which the Author describes) is condensed or collected, and fent forth in Springs and Rivers; the feveral Circumftances of which he confiders and accounts for, as alfo the final Caufe of this Diftribution of Water to the furface of the Earth: That this Subterranean Heat is the caufe of Earthquakes, the many ftrange *Phænomena* of which he relates, fhewing whence each proceeds: That *Vulcanoes*, fuch as *Ætna* and *Vefuvius*, are nothing but Eruptions or Difcharges of this Subterranean Fire; and that the *Thermæ* or Hot Springs alfo owe their Heat entirely unto it. In the latter Section of this Part he treats of the Univerfality of the Deluge; fhews where that mighty Volume of Water which overflowed the Earth in the days of *Noah* is now concealed: Enquires what time of the Year the Deluge began; in what Order, and at what Apertures the Water of the *Abyfs* was brought out upon the Earth, as alfo how it retreated back again.

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In the Fourth Part he treats of the Origine and Formation of Metals and Minerals, and shews that these were all dissolved at the Deluge, as well as Stone, Marble, and the like; and that all Metallick and Mineral Nodules whatever, both those which are in rude lumps, such as the common *Pyrites*, *Flints*, *Agats*, *Onyxes*, *Pebbles*, *Jaspers*, *Cornelians*, and the like: and those which are of a more regular and observable shape, such as the *Selenites*, *Belemnites*, and Mineral Coral, were all amass'd and formed during the time that the Water covered the Earth; and gives an Account of their Varieties, Mixtures, Colours, and Figures; particularly of the Ores of Metals, Flint, Spar, Vitriol, and other Minerals that resemble the Shells of *Echini*, *Conchæ*, *Cochleæ*, and other Shells; for which reason they have been called *Echinitæ*, *Conchitæ*, *Cochlitæ*; shewing that these Bodies were formed and moulded in the Cavities of those Shells which they so resemble, and by what means. That at the general Subsidence, Metals and Minerals, as well those which were thus amass'd into lumps, as those which continued asunder and in single Corpuscles, sunk down to the bottom along with Sand, Coal, Marle, &c. and so were lodged in the *Strata* which the Sand, &c. constituted. That all the Metallick and Mineral matter which is now found in the Fissures or Perpendicular Intervals of the *Strata*, was Originally lodged in single Particles amongst the Sand, &c. in the Bodies of those *Strata*, having been detach'd and drawn thence by little and little by the Water, which continually pervades the *Strata* in its passage from the Abyss to those Fissures, and so on to the surface of the Earth; with an Account of the Minerals and Ores of Metals which lye in these Fissures, and particularly of the formed ones, *e. gr.* of several sorts of *Stalactitæ*, the Iron-Rhombs, Tin-Grains, Mundick-Grains, Crystalized Native Salt, Allom, Vitriol, and Sulphur; as also the Gemms found here, as Crystal, the Pseud-adamants,

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the Amethyſt, and others ; likewise Conſiderations touching the Growth of Metals and Minerals in the Earth : And touching the *Petroleum*, *Bitumen*, Salt, Allom, Vitriol, and other Minerals in the Water of Springs: The Incruſtations or Petrifications of Bodies in Springs and Rivers : The Effect that the Subterranean Heat hath upon Minerals, occaſioning Damps in Mines, Exploſions in Earthquakes ; yea, oftentimes forcing the ſaid Minerals in Steams out at the ſurface of the Earth, where they ſometimes occaſion Fevers, and other Malignant Diſtempers ; and mounting up ſtill higher in the Atmoſphere form Meteors, are the cauſe of Thunder and Lightning, &c. He cloſes up this Fourth Part with a Diſcourſe concerning Amber, which he proves to be neither a Gummous Subſtance, nor a Marine Production, but a Natural Fossil, as Flints, Agats, &c. are, and formed at the Deluge as they were ; it being now found at Land, and in Countries very diſtant from any Sea, as well as upon the Seaſhores, the Sea indeed here waſhing off the Dirt and Earth wherein 'twas before involved, and ſo contributing to the baring and diſcovering of it, but nothing to its Formation.

The Fifth Part is concerning the Alterations which the Terraqueous Globe hath undergone ſince the time of the Deluge. And having in the former Part diſpatch'd what concerns the Changes which happen in the Interior Parts of the Earth, by the Transitions and Removes of Metals and Minerals there ; in this he conſiders thoſe Alterations which befall the Superficial or Exterior Parts of it : ſhewing that the upper or outermoſt *Stratum* of Earth, being the common Fund and Promptuary out of which the matter of all Animals and Vegetables is derived, and into which, that matter is at laſt all returned back again, is in a continual Flux and Revolution ; and takes occaſion here to Diſcourſe of the firſt Particles or Elements of Natural Things: That
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Rocks and Mountains grow lower and lower, the Earth, Sand, &c. being wash'd away, and born down by Rains, &c. With several other material Particulars, which we are constrained to omit here.

The Sixth Part is concerning the state of the Earth, and the Productions of it, before the Deluge; wherein he asserts against the Author of the *Theory*, that the Face of the Antediluvian Earth was not smooth, but uneven, and distinguish'd with Mountains, Valleys, and Plains, as also with Sea, Lakes, and Rivers: That the Sea was then of the same Extent, and intermixt with the Land, as now it is: That the Water of the Sea was salt, and that it was agitated with Tides, as at present: That the Sea was abundantly replenish'd with Fish, as were also the Lakes and Rivers; and that the Earth was as plentifully stockt with Vegetables and Animals: That the Vegetables and Animals of the Primitive Earth did not in any wise differ from those of the present Earth: That there were both Metals and Minerals in the Antediluvian Earth: That the Terraqueous Globe had then the same Site and Position in respect of the Sun, that now it hath, and that there were the same Vicissitudes of Heat and Cold, Wet and Dry, Summer and Winter, that now there is. These Propositions our Author deduces from his Observations upon the Vegetable and Animal Remains of the Antediluvian Earth; and having carefully confer'd herewith the Account which *Moses* hath left us of the Earth, and of the Deluge, he finds it punctually and exactly agreeable to this Account which we have from Nature; and endeavours to shew that Dr. *Burnet* in his *Theory* having in almost all these Heads receded from the *Mosaick* Account, hath as manifestly receded from Nature and Matter of Fact.

There are many very Curious and uncommon Remarks in the several Parts of this Book, concerning the Wisdom and Contrivance that is evident in the Mechanism

nism and Fabrick of the Globe: About the Situation of Paradise: Concerning Vegetation, &c. But for these, and many other things, we cannot do better than refer the Reader to the Book it self.

2. *An Account of a Paper, Entitled, Archibaldi Pitcarnii, M. D. Dissertatio de Febribus, &c.*

Ostendit Auctor solvi Febres & desinere, provocatâ quibuscvis modis secretionem per quasvis vias eliminantes humorem Morbificum, sive is forinsecus invaserit, sive intus consistens in malignam naturam transierit: Nullumque esse genus materiæ quod non possit per quasvis glandulas educi.

Ostendit postea perspirationem apud nos esse secretionis alvinæ decuplam; quippe excretionem, quæ ex pulmone placidæ expirationis vi elicitur, esse perspirationi cutaneæ similem atque accensendam.

Ex hisce deducit decuplò sæpius depelli Febres Medicamento dicato augendæ cutaneæ quam alvinæ excretioni: monetque Catharsin quæ celebratur ope Pharmacorum lenientium, sive etiam levissimè stimulantium, inservire augendæ intestinorum perspirationi, adeoque ad virtutem sudorificam pertinere.

Deinde ostendit ex Mechanicis notissimis, quòd in Febribus (in quibus pulsus est naturali frequentior) velocitas sanguinis est naturali major; & quòd, si pulsus sit & major & frequentior naturali, moles etiam velocitasque sanguinis dato tempore circulantis, naturali sunt majores: Quod eos refellit, qui febricitantibus circuitum sanguinis naturali tardiorē affingunt.

Denique ostendit Methodum quâ invenire potuit Clariss. *Laurentius Bellini*, molem perspirationis singulis

lis minutis primis erumpentem ex villo cujus pondus est scrupulus, esse millesimam ducentessimam partem scrupuli.

Fere oblitus fueram Auctorem initio dissertationis, usum Fermentorum, sive ea Morbis excitandis sive secretionibus extricandis præsent, rejecisse; quippe Orificiorum diversam figuram in corpore animali prius amolitum, sine qua fermento nullus est locus. At negotium istud secretionis non ritè explicaturum illum censeret Auctor qui *Clariss. Newtoni* nostri *Mathematicam Philosophiam* non intellexerit.

Hæc autem omnia explicuit *Pitcarnius*, nullius Philosophorum sectæ, sed Matheos auxilio fretus, quam genuinam esse rationem Physica quævis tractandi, Cordati omnes hodie agnoscunt.

E R R A T A.

Numb. 216. pag. 71. lin. 23. *for*, the Versed Sine of that Difference, *lege* the V. S. of twice that Difference. p. 72. l. 15. *for* Sine of half the Difference, *lege* Sine of the Difference.

L O N D O N:

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